and tri-nitro-cellulose in proportion corresponding to the nitrogen as found by analysis.

The equation for Experiment C may be taken as follows :—

$$\overbrace{6[C_3H_5(NO_3)_3]}^{\text{50 per cent. nitro-glycerin.}} + \overbrace{2[C_6H_7(NO_3)_3O_2] + 3[C_6H_8(NO_3)_2O_3]}^{\text{50 per cent. nitro-cellulose (N = 12·3 per cent.).}} = 25CO_2 + 23CO + 8H + 30N + 30H_2O.$$

The composition of this explosive, calculated from the foregoing formula and found by analysis, is as follows :—

	Formula.	Analysis.
C.....	21·2	21·15
O	60·8	60·67
H.....	2·5	2·67
N.....	15·5	15·58
	100·0	100·07

These are some of the principal features noticeable in a preliminary survey of these experiments. We are continuing our investigations on the lines indicated in the paper, and are especially endeavouring to measure the actual temperature of explosion under varying conditions, and it is hoped that the results obtained will throw some light on the chemical and physical properties of many gases at high temperatures and under considerable pressures, and, at the same time, be useful in the practical application of explosives.

IV. "On the Leicester Earthquake of August 4, 1893." By CHARLES DAVISON, M.A., Mathematical Master at King Edward's High School, Birmingham. Communicated by Professor J. H. POYNTING, F.R.S. Received February 28, 1894.

(Abstract.)

On August 4, 1893, at 6.41 P.M., an earthquake of intensity nearly equal to 6 (according to the Rossi-Forel scale) was felt over the whole of Leicestershire and Rutland and in parts of all the adjoining counties. The disturbed area was 58 miles long, 46 miles broad, and contained an area of about 2066 square miles. The direction of the longer axis (about W. 40° N. and E. 40° S.) and the relative position of the isoseismal lines show that the originating fault, if the earthquake were due to fault-slipping, must run in about the direction indicated, passing between Woodhouse Eaves and Markfield, and heading

towards the north-east. The anticlinal fault of Charnwood Forest, so far as known, satisfies these conditions, and it is highly probable that the earthquake was caused by a slip of this fault.

The beginning of the sound preceded that of the shock in all parts of the disturbed area; the end of the sound followed that of the shock in the central district and in the neighbourhood of the minor axis, but preceded it near the end of the major axis. Thus the sound apparently outraced the shock in the direction of the major axis, but not in that of the minor axis. These time-relations of the sound and shock can be readily explained if the area over which the fault-slip took place were several miles in length, for the sound in all probability is due to small and rapid vibrations proceeding chiefly from the margins of that area.

The intensity was greatest at and near Woodhouse Eaves, and it is probable that the fault-slip began in the neighbourhood of this place, gradually diminishing in amount in either direction, rather rapidly towards the north-west, and much more slowly towards the south-east; the rate at which the slipping advanced being greater than the velocity of the earth-wave. The total length of the fault-slip may have been as much as 12 miles or even more, and there can be little doubt that it was continued for some distance under the Triassic rocks on which Leicester is built.

V. "The Total Solar Eclipse of 16th April, 1893. Report on Results obtained with the Slit Spectroscopes." By E. H. Hills, Capt. R.E. Communicated by the Joint Solar Eclipse Committee. Received March 7, 1894.

The parties in Brazil and Africa were both supplied with these instruments, two being sent to each station. The instruments were arranged to take one photograph only during the eclipse with an exposure as long as possible. It was considered that the amount of light available would not allow of more than one successful exposure being made. Of the four resulting photographs, one of those taken in Brazil was unfortunately not finished before the sun reappeared, whilst the other shows a faint corona spectrum with a strong sky spectrum on both sides, and a considerable amount of general fog over the plate.

I have been able to detect nothing of interest in this photograph, for the Fraunhofer lines overlap the corona spectrum to such a degree that it is impossible to distinguish any bright lines with certainty.

The instrument employed in Africa consisted of two spectroscopes, on one equatorial mounting. The first spectroscope had two prisms,